

licious scent of heather-honey for my nose if I apply it to the golden cowslip-balls in miniature, after I have shaken off the bees, which might not behave kindly to my proboscis, mistaking it for a rival to their own in the honey-gathering trade."

This, alas! is typical of many others which give a painful stab in the middle of chapters containing a great deal of interesting and valuable information.

The book is illustrated by some very fair photographic reproductions, but the coloured plates are miserable. The sad part is that Mr. Bowles has the knowledge that others seek to acquire, but an evil spirit appears to haunt him when he takes his pen to write.

The book contains a great deal of very valuable and interesting information, but the shock to the literary sensibilities of those who seek to extract the gold is almost too severe.

(4) The pictures of desert flowers will be very useful to travellers interested in the desert flora of Egypt. The photographs, especially when taken in the field, are good, and the introductory twelve pages are well written. We hope Miss Crowfoot will be rewarded by a ready sale for her book, and induced thereby to publish a further volume of pictures of the flowers of the desert. Should this be feasible a plate giving a detailed study of the flowers, fruits, and leaves of each plant, would be a useful addition to accompany the plate showing the habit of the plant in its natural conditions.

(5) "Flower Favourites" is a very pretty little book, a storehouse of quaint legend and myth relating to some forty-eight well-known flowers. Among them are such familiar plants as the rose, cowslip, speedwell, leek, and hyacinth, and in all cases numerous quotations from the poets are given which refer to the particular flowers. It is a book for which lovers of flowers will be grateful, since it has been compiled with great care, and shows that the author has a very extensive knowledge of the ancient and modern literature of plant lore. It is essentially a book to be appreciated by those whose vision penetrates beneath the surface.

"Earth's crammed with heaven
And every common bush afire with God:
But only he who sees takes off his shoes:
The rest sit round and pluck the black berries."

OUR BOOKSHELF.

Kinetische Stereochemie der Kohlenstoffverbindungen. By Dr. A. von Weinberg. Pp. viii+107. (Braunschweig: F. Vieweg und Sohn, 1914.) Price 3 marks.

It would be difficult within the compass of a short notice to develop the highly speculative concep-

tion which underlies what the author terms "kinetische stereochemie." He claims that it will eliminate the vague notions which hover round the theory of valency, and have rendered it necessary to qualify this attribute by the use of "partial" valencies, broken valencies, distributed valencies, and valency electrons.

Dr. von Weinberg has attempted to prove that chemical changes are determined by atomic motions; that these motions are rotatory and vibratory, and are closely linked to the phenomena of heat of combustion and molecular refraction. He considers that by means of this conception it is possible to solve a variety of unsolved problems, such as the structure of benzene, the phenomenon of dynamic isomerism, the asymmetric carbon, optical activity and colour.

He lays down the proposition that in all states of aggregation the atom has motion, and that the energy content of these atomic motions in organic compounds may be determined by the atomic volumes, which in turn can be estimated as heat of combustion and atomic refractivity. He further assumes that singly-bound atoms rotate or oscillate round an axis, and that doubly- and trebly-linked atoms undergo a vibratory movement. The difference in the heat of combustion of an atom when combined in an organic compound and when free as an elementary molecule is not a question of a change in chemical affinity, but of the increase or decrease in atomic motion in the two states. In the same way increase or decrease of atomic volume, as determined by the motion (rotatory or vibratory) of the combined atom, is manifested by the density of the liquid substance, *i.e.*, its refractivity. These two ideas are developed conjointly at some length, and a considerable mass of data is introduced to support the theory. We think that some of the statements are open to criticism, such, for example, as making one kind of atom in a compound responsible for the whole difference in the heat of combustion, and consequently in atomic motion and so forth. Whether these speculations, for they are pure speculations, will serve to stimulate further experimental inquiry is somewhat doubtful; but the theory is bold and suggestive, and the pamphlet is well worth perusal.

J. B. C.

The Essence of Astronomy: Things Everyone Should Know about the Sun, Moon, and Stars.

By E. W. Price. Pp. xiv+207. (New York and London: G. P. Putnam's Sons, 1914.) Price 10s. 6d. net.

THE title "The Essence of Astronomy" gives a good idea of the lines on which this book has been written. The book does not pretend to be a treatise, and it deals only with the main, well-authenticated facts in a popular manner. All technical terms, mathematical formulæ, and symbols have been omitted in the text, but the last-mentioned are given on a separate page at the end of the volume.

Those who wish to read a simple and brief account of the main facts about the sun, planets, asteroids, comets, and stars (normal and abnormal) cannot do better than peruse this book. A general idea of the universe will be easily obtained, and some notion of the vast subject of astronomy will be gained. The illustrations are reproduced from some of the finest photographs ever taken, and they are well distributed and chosen. A brief bibliography of books more or less popular is given at the end; also a chronology of the main events of astronomy from very early times to 1908. With regard to the latter the author seems to think that such a table is unique or "what the compiler has never happened to see before." To take only one instance, he has evidently never seen Miss Clerke's admirable "History of Astronomy during the Nineteenth Century," at the end of which is a chronological table stating the main astronomical advances from 1774 to 1893.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Fizeau's Experiment and the Principle of Relativity.

MR. CUNNINGHAM seems determined that the principle of relativity shall assert supremacy as regards the Fizeau effect on the velocity of light, arising from motion of the transmitting medium. This is a first-order effect, while the principle of relativity was invented to account for the second order. Up to the first order the affairs of moving media hang entirely on the ascertained fundamental relations of electro-dynamics; and any type of relativity which does not agree with the formula thence deduced must, if substantiated, upset our whole system of ideas.

As regards the arguments adduced: (1) is of course a slip of the pen—he is thinking of steady viscous flow in a pipe, whereas the standard measures for ordinary turbulent flow are in general agreement with the values quoted from the experiment; while as regards (2), it seems certain that the experimenters must have had before them the effect of variation of velocity across the section of the pipe, which would curve the fronts of the waves and thus broaden the interference bands, but not much if only the central part of the pipe, in which the velocity varies but slightly, is employed. The shift at the centre of the band-system would depend on the axial velocity only.

JOSEPH LARMOR.

Cambridge, November 2.

THERE was no intention in the letter to which Sir Joseph Larmor refers (NATURE, October 29, p. 226) of suggesting that the principle of relativity and the fundamental relations of electro-dynamics were at variance with respect to this matter. Certainly I have always taken them to be completely at one. But it has been raised in several quarters as an

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objection to both points of view that the extremely careful experiment of Michelson and Morley was not in complete agreement with theory. They found the convection coefficient for water to be 0.434 ± 0.02 , while theory (taking account of dispersion according to Lorentz's formula) gives 0.451 , which is very near the limit of possible error.

Sir Joseph Larmor makes it clear that the suggestions which I made as to the possible origin of the discrepancy are untenable, and, I understand, feels that it must lie in the inherent difficulties of the experiment. One of these is the determination of the axial velocity in terms of the mean. The experimental device could not be expected, I think, to give a result correct to one or two per cent., inasmuch as the pressure gradient actually measured is partly the normal pressure gradient of the undisturbed flow, and partly that due to the disturbance produced by the insertion of the gauge-tubes.

But, as a matter of fact, the discrepancy is not so great as has been thought. A recalculation from the figures and formulæ of Michelson and Morley, which Sir Joseph Larmor has now checked for me, gives for the experimental value of the coefficient 0.442 , with their estimated possible error of ± 0.02 . Thus the discrepancy (0.009) with the value given by Lorentz's formula (including dispersion) proves to be less than half the possible error.

E. CUNNINGHAM.

Wireless Signalling for Shipping in War Time.

THE advantage which wireless telegraphy has been in enabling the whereabouts of vessels at sea to be known from day to day, is now in abeyance, I believe, on account of the war, because of the messages being liable to be read by the enemy.

But if a system of signalling false latitudes and longitudes by a code prearranged by the owners, different for each craft, and variable from day to day, easy and simple to translate by reference to the copy kept, then wireless signalling could go on as freely as before, without danger of the code being captured by the capture of any craft.

To illustrate the method of this, let us suppose a firm of owners have two ships, the *Ariadne* and *Ocean Bird*. A list of dates has been given to each captain with instructions to falsify positions on the respective dates (London time) with additions and subtractions as found in the list in opposition to the dates, thus:—

SHIP "ARIADNE."

		Lat.		Long.
Nov. 1	...	+14°	...	-21°
2	...	-16°	...	+15°
3	...	+30°	...	+20°
		etc.		

SHIP "OCEAN BIRD."

		Lat.		Long.
Nov. 1	...	-18°	...	+24°
2	...	-16°	...	-21°
3	...	+18°	...	+15°
		etc.		

The owners of these ships could interpret the wireless messages received through the exchange, and the Admiralty be quickly notified of a disappearance with approximate latitude and longitude.

A. BOWMAN.

144 Well Street, Hackney.